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ABSTRACT

This project report describes the development of a seventh-grade curriculum to promote microcomputer keyboarding skills, i.e., learning correct alpha-numeric reaches, developing proficiency in making appropriate reaches, using correct fingering without looking at the keyboard, and attaining a degree of speed and accuracy. Although the curriculum was piloted with approximately 200 seventh-grade students, it was designed for use in grades 6, 7, or 8. A curriculum guide for microcomputer keyboarding and an instrument to evaluate the curriculum were developed. Midway through the pilot, the curriculum was evaluated and upgraded based on a semester's experience. Pre- and posttest scores indicated that all students, including those in special education, improved their speed and accuracy in keyboarding skills. The keyboarding curriculum is appended to the report. It details the philosophy, objectives, and design of the course. The procedures are outlined, and student progress within the software is described. Both the advantages and disadvantages of microcomputer keyboarding are also discussed. Other sections offer suggestions for computer usage when not committed to keyboarding, conclusions, recommendations, lesson plans for an eight-week course, and pilot test results. A second appendix provides measuring instruments. (YLB)

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MICROCOMPUTER KEYBOARDING CURRICULUM FOR MIDDLE AND JUNIOR HIGH SCHOOL STUDENTS

FINAL REPORT

PREPARED BY
REGIONAL SCHOOL DISTRICT 10
BURLINGTON, CT 06013

PREPARED FOR

CONNECTICUT STATE DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL AND ADULT EDUCATION
BUREAU OF VOCATIONAL PROGRAM PLANNING AND DEVELOPMENT
HARTFORD, CONNECTICUT 06115

PROJECT DIRECTOR: DR. JAMES SCHMIDT
PROJECT STAFF: DIANE BRESCIA

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AUGUST 27, 1984

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PREFACE

During the 1983-84 school year Regional School District #10 developed and piloted a keyboarding curriculum for students in the seventh grade. As used in this report, keyboarding means the learning of correct alpha-numeric reaches, proficiency in making appropriate reaches, using correct fingering without looking at the keyboard, and a degree of speed and accuracy.

The Har-Bur Middle School has a commitment to make keyboarding and computer literacy an integral part of the curriculum. In order to accomplish this goal, the Har-Bur schedule has been adjusted to permit all students to take a keyboarding course in Grade 7. Thus, all students taking computer literacy in Grade 8 will have completed a keyboarding course and will be expected to use proper keyboarding techniques. In the development of the curriculum, the Regional School District #10 Board of Education supplemented a state grant that allowed the use of 13 microcomputers, a printer and a keyboarding software package.

Success with the keyboarding program has prompted this school district to increase the scope of the program. During the 1984-85 school year an eighth grade elective called Term Paper Editing will be offered. This follow-up course to keyboarding will allow students to prepare their report and papers using a word processing package and further develop their keyboarding skills. In addition, the Har-Bur Library-Media Center will allow students to use the computers, printers and software available in the center. School policy encourages students to hand in assigned papers and reports that have been processed on the computer.

Parents and students alike have been most supportive of our program.

ACKNOWLEDGMENTS

Regional School District #10 would like to commend all staff members who participated in the program, as well as State Education Department personnel who contributed toward the program's success. Special thanks are due to Dr. James Schmidt, Diane Brescia, Dave Crompton, Joseph Petrone, Dennis Janicki, Kay Kalin and Andrea Giovanniello. Valuable assistance was also received from Dr. Valerie Pichanick and Joan Briggaman.

ABSTRACT

Title of Project: "Developing and Piloting a Microcomputer Keyboarding Curriculum For Middle and Junior High Students"

Project Director: Dr. James Schmidt, Principal

Applicant Organization: Regional School District #10
Mills Drive, Burlington, Ct 06013

Total Federal Funds Requested: $10,000

Beginning Date: July 1, 1983 Ending Date: June 30, 1984

Objectives:

1. To develop, within the business department, a seventh grade curriculum which provides skillful alphabetic and numeric keyboarding. This curriculum could be used by other schools in grades 6, 7 or 8.

2. To review and evaluate published software for utilization in developing the curriculum.

3. To pilot the keyboarding curriculum using a certified business teacher.

4. At the conclusion of the pilot program, to prepare a model microcomputer keyboarding curriculum for delivery to the bureau of Vocational Program Planning and Development.

Project Design: The design of this project involves four major activities: a survey of all related curricular materials and computer software; a review of survey results and preparation of a curriculum guide for microcomputer keyboarding; the piloting of the curriculum, with modifications made as needed; and the completion of a final curriculum guide.

Contribution to Education: This project will result in the publication of a curriculum guide for microcomputer keyboarding; one thoroughly piloted using a sample of over 200 seventh grade students. The long-range advantage of such a guide, which would be available to all Connecticut schools, should be the development of proper keyboarding skills by thousands of middle/junior high school students prior to their entry to senior high school.

INTRODUCTION

Statement of the Problem

The computer has remained at the threshold of most school doors for the past 20 years. With the invention of the silicon chip, computer technology has become widely accessible to most school districts in Connecticut and throughout the nation.

A long-time possession of the high school, the computer (in the form of a microcomputer) is increasingly found at the elementary, middle and junior high school levels. As younger students begin to use the microcomputer, the traditional "hunt and peck" method of interacting with the computer is understandably employed by large numbers of students. Simultaneously, as industry accelerates its use of microcomputers and computer terminals, this "hunt and peck" technique is seen realistically as offsetting the equipment's potential for speed in data entry. Clearly, as the need for skillful alphabetic and numeric fingering on the microcomputer keyboard is pressing on this nation's businesses and industries, there is a consequent demand on the country's schools. In particular, as the use of computers extends into the lower grades, an "early" course in keyboarding is rapidly becoming a need which the schools must meet. The place to begin is in the middle and junior high school.

Until the present time, there was no established curriculum in Connecticut for microcomputer keyboarding at the middle school/junior high level. Such a curriculum has been written and piloted with seventh grade classes at the Har-Bur Middle School.

Review of Related Research Findings

Since the introduction of microcomputers is such a relatively recent phenomenon, there is no research base for reference purposes. Numerous articles and a limited number of books address the area of "computer literacy." However, the topic of microcomputer keyboarding is in an embryonic stage.

Some publishers, identifying the void as significant, have produced software for use in schools for teaching keyboarding skills. As with most software which has appeared of late, it is yet to be tested in the "laboratory" of the classroom. School personnel will have to determine by themselves its appropriateness and merit.

Fortunately a key document on this topic has emerged from the Connecticut State Department of Education. Prepared by Consultants Joan S. Briggaman and William F. Clynes, this position paper, "Microcomputers In Education: Special Focus on Business Education," targets the high school graduates of the 1980's. Significant points made are:

1. Business is looking for people who possess keyboarding skills, have the skills and knowledge to manipulate the software and machine, and to set up basic programs. Business wants employees at all levels who understand the capabilities of the microcomputer and are comfortable with it.

2. Most people agree that literacy includes:
   Interaction/hands-on use of the computer
   Keyboarding
   Understanding technology
   Using software

   While each district will design its own programs, middle/junior high topics might include:
   Terms and technology
   Keyboarding

3. At the point students are required to give more than single key responses in computer interactions, proper keyboarding instruction should be taught and required for further use of the computers.

   The business department design and teach a 10-week keyboarding course to meet the needs of students to be computer literate.

4. An area that will be impacted heavily and require the most change and adaptation will be the area of typewriting. Business educators are going to have to accept the fact that "Keyboarding" (the ability to use the right fingers on the right keys) is going to be separated from the traditional typing program and become a component of computer literacy taught on electric typewriters by a business educator. It will be taught to students at a much earlier age than is presently being done. A strong one-period-per-day/8-10 week design must be available for students at the elementary/middle school level. Major textbook and microcomputer companies are already developing keyboarding instructional software. It is going to happen so it is best that Business Educators get involved in the design and teaching so that correct keyboarding will be an asset to the student on a life-long basis.

Objectives

1. To develop, within the business department, a curriculum which provides skillful alphabetic and numeric keyboarding.
2. To review and evaluate published software for utilization in developing the curriculum.
3. To pilot the keyboarding curriculum using a certified business teacher.
4. At the conclusion of the pilot program, to prepare a model microcomputer keyboarding curriculum for delivery to the Bureau of Vocational Program Planning and Development.

SUMMARY

Findings

An evaluation of student progress in the Grade 7 keyboarding course indicates that this offering can be both a successful and important experience for students. All students, including those in special education, improved their speed and accuracy in keyboarding skills as a result of this experience. In addition to the earlier introduction of keyboarding techniques for future users of both word processors and typewriters, the program provided a highly individualized and non-threatening experience greared to skill mastery in an environment which promoted success.

Most students demonstrated an ability to keyboard without referring to the position of their fingers. In addition, students were less apprehensive in related courses about using a computer, demonstrated proper posture and were able to input programs faster and accurately.

Unanticipated Problems

No major problems were encountered.

Several minor problems were met. The late delivery of the software provided the teacher with little time to preview the software before using it. Also, the first semester classes lost a few class periods because of snow days in January. An outbreak of flu also reduced the total number of classes attended by some of the students meeting during the first semester.

Recommendations

1. A course should be offered to remediate students who had difficulty or did not reach minimum proficiency levels. Some students may need further practice to attain minimum standards.

2. The business curriculum should be restructured to include grades seven through twelve with more courses such as keyboarding and word processing offered to the general student body.
3. Exposure to word processing on different software should be included in the curriculum to allow students to transfer their keyboarding skills.
4. Word processing should be offered to all students—not just higher level business students.

Conclusion

Keyboarding is a required course in grade 7. It can be assumed that all students from grade 7 and up will know the basic keyboard.

Keyboarding can no longer be considered a course for business students but a core course for all students. Higher levels of word processing should be business courses, but all students should have basic keyboarding skills and basic word processing skills without being a "Business" major.

In the keyboarding course, the teacher is a manager of learning—not the source of instruction. Methods of teaching and evaluating will have to be adjusted. The teacher becomes a coach who guides and directs.

Keyboarding skills should be reviewed and build upon every year to attain higher levels of proficiency. Students can not take one course and "know" the keyboard well enough to avoid further skill building. Yearly review of the keyboard and further applications of keyboarding on a microcomputer should be added to the student's knowledge.

All subject area teachers in a school should cooperate and require students to use correct keyboarding techniques once they have been learned. Teachers should give extra credit for papers completed on a microcomputer or typewriter.

PROJECT DESIGN

General Design

1. A Survey was made of all curricular materials and computer software, in the area of keyboarding skill development as well as recommendations of professional and governmental organizations on this topic.
2. A curriculum team, working with assistance from appropriate consultants such as Connecticut State Department staff, reviewed the results of the survey and then prepared a curriculum guide for microcomputer keyboarding (see Appendix A). The curriculum team also developed an instrument to evaluate the curriculum.
3. The curriculum was then piloted with successive groups of students. Mid-way through the pilot, the curriculum was evaluated and upgraded based on a semester's experience. At the end of the pilot, additional modifications were made as needed.
4. A final curriculum guide is being produced for dissemination to the Bureau of Vocational Program Planning and Development.

Setting

The program was developed using instructional staff at the secondary level (grades 7-12) and students in grade 7 at the Har-Bur Middle School. Approximately 200 students participated in the pilot within heterogeneously scheduled groups.

A room previously used for introductory typing classes was used for the keyboarding pilot, thus keeping class size in the 10-12 range. Students attended the class a total of two periods a week for 18 weeks. Each period was 44 minutes in length. The class was taught using TRS 80 Model 4 microcomputers, with 64K memory, a printer and in a networking configuration. The Southwestern Publishing

Company software "Microcomputer Keyboarding" was selected to teach the keyboarding. Exposure to word processing software was arranged for all students for informational and enrichment purposes. (see Appendix A)

Participants

1. Professional staff - Five professional staff members worked directly on the project. They were: the district's director of curriculum, who oversaw the project and assisted in the initial survey; the middle school principal, who coordinated the specific activities needed to insure the success of the program; the high school business department head, who assisted in the review of curricular materials and software and established the continuity of the program with subsequent offerings at the high school level; the middle school business teacher, who wrote the curriculum, piloted and identified areas needing modification; and the middle school computer education teacher who assisted in establishing the scope and sequence of the pilot program and the curriculum as they related to other computer instruction in grades 7 and 8.
2. Students - Approximately 200 seventh-grade students participated in the pilot program, thus insuring that keyboarding instruction is offered to all students prior to taking computer literacy and to entering high school. The schedule was arranged so that this program could be offered without creating conflicts with either required or elective courses the students would take.
3. Outside Consultants - Such personnel were used throughout the project. These included:

   State Education Department Consultants
   Educational Consultants from Publishers and Other Commercial Organizations
   Computer Education Consultants from CREC and/or RESCUE
   Members of the Region 10 Citizen/Faculty Computer Education Committee

Methods

1. Using the resources of the Connecticut State Department of Education, the two regional centers CREC and RESCUE, and other appropriate agencies, a search was conducted to identify what specific curriculum guides in microcomputer keyboarding were presently available, what instructional support materials, such as software, were available and what is presently being developed.
2. Using the materials and guides obtained during the search, a curriculum team of three professional educators selected software and prepared a curriculum guide for microcomputer keyboarding.
3. The curriculum guide was used in a keyboarding course which commenced in September, 1983.

   During each semester the course was offered, approximately 100 students in grade 7 in heterogeneous groups of 10-12, based on English assignments, participated in the pilot. At the end of each semester, student results were evaluated. Students were closely monitored to determine the amount of time it took for proper skill acquisition. The guide was then modified as needed, the basis for any changes reflected the ability of the guide to meet the needs of typical seventh graders. Such dimensions as manual dexterity, scope of instructional objectives, and appropriateness of software were addressed.
4. A final document incorporating those modifications, "A Curriculum Guide in Microcomputer Keyboarding for Middle and Junior High School Students," (see Appendix A) was prepared for delivery to the Bureau of Vocational Program Planning and Development.

Evaluation Design

A pre-test/post-test model was utilized. Each of the approximately 200 students who participated in the project was given a pre-test (see Appendix B) using the microcomputer keyboard. At the conclusion of the 18-week session, a post-test (see Appendix B) was given to measure student progress utilizing appropriate keyboarding skills. Differences in scores were tabulated with mean scores compared.

Results

Most students exhibited ability to keyboard without constantly looking at their fingers. Proper fingering technique was used for all class work.

The pre-test and post-test speed scores were compared for each reading level using the pre-test and the line post-test scores. All levels showed improvement.

Grade Seven - First Semester

Level	Pre-Test Mean	Post-Test Mean
Honors	10.53	35.05
Advanced	7.67	29.04
General College	7.45	24.54
Low General	8.41	22.67
Remedial	9.0	22.2
Special Education	5.5	14.0

Grade Seven - Second Semester

Level	Pre-Test Mean	Post-Test Mean
Honors	10.88	40.25
Advanced	10.18	34.12
General College	8.56	30.61
Low General	7.31	22.62
Remedial	6.86	26.29

During the second semester, teacher use of the software was more proficient, classes met more sessions due to lack of snow days and flu epidemic, and the software was available for the first class period. First semester students started late and encountered numerous snow days at the end of their term.

Observations have been made by math teachers who teach Introduction to Computers and Programming. Students who had taken keyboarding had no apprehension about using a computer, had good posture, and could input programs faster with good accuracy.

Teaching statistics were well documented with respect to their impact on student skill attainment.

Time Schedule

To assist with project planning and management, Regional School District #10 used Time Sequence Graphics (TSG) as the time-task management tool. (see Appendix C) Advantages of this approach were:

1. objectives are described in behavioral terms
2. time constraints for completion are identified
3. the person responsible for each objective is listed
4. the project manager must verify the successful completion of each objective
5. a sufficient overview of all activities is presented
6. the workloads of project participants can be analyzed
7. a list of duties needed to complete the project is provided
8. the TSG can be cross referenced with MBO, PERT, and similar time/task graphics.

Results

This project has resulted in the development and publication of a microcomputer keyboarding curriculum (see Appendix A) for use in grade 7; however the curriculum is suitable for use in grades 6 and 8 as well. The value of the completed curriculum will continue to be determined by an ongoing assessment of the

initially prepared guide. Over 15 groups of students have participated in the piloting of the curriculum. As needed adjustments to the guide were identified, they were made.

Sex Equity

Since every student in the seventh grade at Har-Bur Middle School participated in the pilot, the curriculum guide was demonstrated to promote sex equity. The guide was written as a curriculum for all students, with sex-fair language and non-stereotypical presentation of male and female roles. The guidelines established by the State Department of Education Equity Consultant were followed in developing the curriculum.

A committee of trained educators reviewed the completed curriculum for sex equity. The Equity Consultant will have signed off on the completed curriculum before it is printed.

Dissemination

Results of this project, in the form of a microcomputer keyboarding curriculum for middle and junior high school students, is being disseminated in print format through the Bureau of Vocational Program Planning and Development of the State Department of Education. The required four copies of the curriculum and this report and information about the software utilized by the project were provided to the State Department of Education for dissemination.

APPENDIX A

KEYBOARDING CURRICULUM

APPENDIX A

PHILOSOPHY

A long-time possession of the high school, the computer (in the form of a microcomputer) is increasingly found in the elementary, middle and junior high school levels. As younger students begin to use the microcomputer, the traditional "hunt and peck" method of interacting with the computer is understandably employed by large numbers of students. Simultaneously, as industry accelerated its use of microcomputers and computer terminals, this "hunt and peck" technique is seen realistically as offsetting the equipment's potential for speed in data entry. Clearly, as the need for skillful alphabetic and numeric fingering on the microcomputer keyboard is pressing on this nation's businesses and industries, there is a consequent demand on the country's schools. In particular, as the use of computers extends into the lower grades, an "early" course in keyboarding is rapidly becoming a need which the schools must meet. The place to begin is in the middle and junior high school.

OBJECTIVES

The course on microcomputer keyboarding is an introduction to the keyboard and the proper way to use it. Students must be trained on the correct way to use a computer from the first encounter with any keyboard. This course serves as an introduction to the computer keyboard. The major objectives are:

1. All students will know the microcomputer keyboard and will use proper fingering techniques.
2. Students will demonstrate a proficiency in keyboarding with minimal looking at the keyboard.

3. Students will achieve a minimum speed competency of twenty-four words a minute on a thirty second timed writing on a sentence located in the software.
4. All students will understand and be able to use computer menus.
5. All students will have experience using the computer keyboard and will exhibit familiarity with a computer.

DESIGN

The microcomputer keyboarding course was taught using Microcomputer Keyboarding by South-Western Publishing Company. Class length was forty-four minutes for the pilot group. Students were enrolled in the class for one half year. Classes met twice a week. It would be preferable to meet the students every day for a marking period for better retention of learning. All learning was self-paced. Radio Shack Model Three and Model Four computers were networked with a Networking controller. The Baud Rate in the Network system was changed to 19200 for faster accessing of material.

Scripsit, a word processing program, can be copied onto the Network disk to provide greater flexibility. Students who finished the software early can use Scripsit to practice traditional typing materials in the word processing mode. Several students may come to class with a temporary injury to one hand or finger. Scripsit can be loaded into their computer and one-handed drills from other drill material can be used for practice material until the injury heals. This usually involves one class period.

PROCEDURES

NETWORK PREPARATIONS

All machines are booted into Network 3 and have the appropriate disk read into them before and during homeroom. This can take ten to fifteen minutes.

WARM-UP

Before the class enters the room, a lesson is loaded into all computers. This is usually a lesson that almost everyone has finished. As students enter the room, they can sit at any machine and do warm-up practice on the lesson that is on the screen. At least 5 minutes of warm-up is allowed. This provides the teacher with time for administrative details.

NEW WORK

Students are told where they left off at the previous class period. This is done individually and slowly for two reasons: 1. To insure that no student skips any part of any lesson and begins in the proper place. 2. There is less down time for students who may have to sit at "Please wait." If the entire class moves to a new lesson at the same time, some students may have a several minute wait to get their lesson. If a student has to do a few extra minutes of warm-up, this will not harm them in any way.

PROGRESS CHECKS

As students work, their progress is checked and corrected. Progress sheets are dated and each student's technique is recorded on a daily basis. Students are checked and corrected on posture, palms up, stroking, proper reach, effort or conduct, and if they look at their fingers. A technique sheet copied from the teacher's manual and a daily progress sheet adapted from the publisher's sample are included with this report. See Appendix B. The technique sheet from the teacher's manual goes only through lesson 12 and consists of two pages. This form was adapted and made into one page with room for notations, dates lessons were covered and absences to be recorded. The student's names were recorded on the top of the progress report with their grade level or other

pertinent information. All the technique sheets for each class were stapled together.

GRADING

Students were monitored daily and progress was noted on their sheet. Any marking system can be used. A check mark was used for good performance, a minus sign for work that needed improvement and a 0 was used for very poor performance.

Using the daily progress sheets, corrections in attitudes and work habits can easily be noted. A student who may be apprehensive the first few days of class will not practice or perform well. As that student gains self-confidence, their performance will improve. This student should not be panalized for a slow start, but rewarded for correcting bad habits. Student's grades are determined from the progress sheets.

SPEED DEVELOPMENT

Students are instructed to tell the teacher what their best speed is on lines and on paragraphs for each lesson. This means that students usually report timed writings on a daily basis. These scores are recorded on the student's progress sheet by the teacher. Older students or adults may wish to maintain their progress sheets. The progress sheets allow the students and the teacher to monitor improvements in speed and to discard "bad" days. After lesson 12 or 13, as students report this speed, the teacher can check their screen and show each student how to count errors. Most give themselves too many, so before a score is recorded, the teacher should read the screen with the student and together they can count the errors.

MOTIVATIONAL DEVICES

As students progress, the teacher can tell each student what their last

best speed was. They are told this is their speed goal for the day, to match or beat their own score.

Warm-up time is a good time for the teacher to demonstrate technique. When most students have keyboarded Lessons 10 or 11, several demonstrations can be done by the teacher at the beginning of the period and then have the students practice that technique during the class period.

How to make down reaches easier can be demonstrated by the teacher emphasizing good posture, palms up, proper fingering, and good body position. The warm-up for this class period should be Lesson 9 or 10 so students may apply the demonstration on their warm-up practice. An oral drill on fingering on the lower bank of keys would be in order here. If all students stay at the lesson menu, the alphabetic keys are disabled—striking one of these keys will have no effect on the software and will not print. The teacher can also demonstrate at a computer and do several timed writings so students can observe good technique. The teacher can type at nice easy pace of about 40 words a minute, demonstrating good rhythm technique. Emphasize that keys are not struck rapidly, but pauses between key striking are reduced. Striking the enter key immediately after typing the last character on the line can be demonstrated on yet another day. Emphasize not moving the hand from the home row position and moving on to the next line.

When a student seems to be stalled at one speed, they will be told during the warm-up period what their last speed was. Their instructions for that class period are to try to better their speed. Occasionally, everyone's speed on a particular lesson will be charted. Then students can see how they are doing in comparison with other students in different classes. This chart is posted on the wall and mentioned in every class. Students usually take great interest in

how they compare to fellow classmates.

As students seem to be stalled in the thirties on their timed writings, a 40 CLUB can be established. A chart is posted on the wall. Announcements are made that any student after Lesson 25 who can type a timed sentence at forty words a minute or more with no more than two or three errors will be a member of the club. As more names are posted to the club, students will begin checking the chart daily to see who has been added. Eventually a 50 CLUB can be established.

END OF CLASS PROCEDURES

Five minutes before the end of the class, students are asked for the lesson number on their screen. This is recorded on their progress chart. Then students are instructed to load a warm-up lesson into their machine for the next class. The computers have most of their down time during the three minutes as classes change. By the time the next class comes in, the machines are loaded with the warm-up lesson. Most students come in and start warming up before the late bell rings.

STUDENT PROGRESS WITHIN THE SOFTWARE

MENUS

Students should be taught from the first class period to READ MENUS!

ESCAPE

Lesson 1 has no escape—once the lesson is started it must be finished.

To escape from the other lessons, any time STRIKE ENTER appears on the screen, strike the up arrow to return to the menu of the lesson that was being keyboarded. If the up arrow is struck again, it will return the student to the Main Menu of the disk in the host computer.

CHANGING DISKS

Students may work on different disks but it requires good classroom management to ensure that no errors are made and changing lessons is done efficiently.

1. Have all machines in the network system, with a lesson loaded into each student station. Students should warm-up and review on this lesson.

2. All students should remain on their warm-up lesson until told to move. No one should return to the Main Menu unless instructed to do so by the teacher.

3. Ascertain which students need a different disk than the one now in the host computer. Change the disk in drive 1 to the one containing the proper lesson. Instruct ONLY the students who need lessons on that disk which lesson they are looking for. They can move to that lesson using the up arrow technique to escape the warm-up lesson. When they return to the Main Menu, the computer will show the Main Menu for the disk currently in the host computer. The proper lesson can be requested. All other students are still doing review practice.

4. When the host computer has finished loading lessons into the students' machines, change the disk. Then instruct the rest of the students what lesson they should be working on. They can use the up arrow escape technique.

5. When a lesson is loaded into a computer, the entire lesson is loaded. A student does not have to go back to the host computer once they receive their proper lesson. Only Lesson 1 returns after the welcome to load more information.

ERROR MESSAGES

If a student should arrive at the end of a lesson and request a new lesson that is not in the host computer at that time, an error message will appear on their screen with the message to STRIKE ENTER. Instruct students when they see an error message THEY MUST NOT STRIKE THE ENTER KEY. If they do strike the enter key, the

computer is no longer in the network system and must be rebooted. If instead of the enter they strike the up arrow, it will return them to the lesson menu of the lesson they just finished. They may then request the proper disk be put into the host computer and proceed to the proper lesson.

USING DISK 4

Disk 4 must be read in a machine to load the lessons properly. The graphics on this disk vary from the others. You can move from a lesson menu on disk 3 to the Main Menu of disk 4 and on to a lesson, but the lesson may be jumbled and the graphics are not correct. Moving through the lesson menus in Disk 1, Disk 2, or Disk 3 present no problem. At the point where students are divided between Disk 3 and Disk 4, computers on one side of the room or in one section may have Disk 4 read into them in the morning. As classes enter the room, students can be instructed to sit at those machines if they are on the fourth disk. A minor problem can occur if Disk 4 is read into a machine, then a lesson from Disk 3 is accessed. In the conditioning practice the space bar may hide part of the line to be typed. If any key is struck, the proper key will be flashed on the keyboard on the screen. The line can be finished in this manner. This happens only on the conditioning practice and presents no major problems.

ADVANTAGES OF MICROCOMPUTER KEYBOARDING

The keyboarding program on the microcomputer has worked out to be far superior to other forms of instructional keyboarding for several reasons. After an initial period of readjustment for the teacher (the students tend to adapt faster), a more efficient program can be run.

Students being absent one or more days or weeks does not affect the class or the student procedures. That student always begins work where they left off the previous class they attended.

Spacing after a period is handled well. From the first time students encounter the period and its spacing problems, they must type it properly. In the drill work, a student can not go on unless two spaces are keyboarded at the end of a sentence. This seems to have eliminated any spacing problems at the end of the sentence.

The noise of a typing room is eliminated. The room is blissfully quiet with fewer distractions. This can make for a better learning environment.

Students who have better finger dexterity can proceed without being held back by slower students. Students who may be slower in their comprehension can take all the time they need to read, understand and practice their keyboarding lesson. No one is hindered by another student's ability or lack of ability. Most students liked this and it can be a motivational factor for this type of program.

The primary learning comes from the computer while the teacher manages the learning process. This means the teacher has more time to work on an individual basis with each student correcting fingering and speed techniques. Individual observation of student technique and correction of poor technique is part of the daily class procedures and results in better technique and higher speeds.

The computer has a feather touch. The more difficult reaches can be learned with more comfort and higher speeds can be attained sooner in the learning process.

DISADVANTAGES OF MICROCOMPUTER KEYBOARDING

Until students and teachers are used to changing disks to accommodate students in different lessons, beginning each class period can be a slow process. It is important to insure that students do not move to new lessons unless they check with the teacher to ensure the proper disk is in the host computer. (See the section on student movement in the software)

Students don't always understand third finger or first finger. The teacher must reemphasize which finger to use and most students need to be monitored to ensure that they continue to use proper fingering.

Shifting with the wrong shift key is very easy to do because of the light touch of the computer keyboard. Shifting needs to be reviewed as a class and drill work must be monitored carefully.

Not all students have the maturity to take the extra practice or to repeat a drill when asked by the computer if they wish to do so. Student work must be constantly monitored to make sure that no one skips a part of a lesson or races through a section to avoid more practice. Students can waste practice on timed sentences and paragraphs by striking any jumble of keys and attaining speeds of 200 words a minute or more. Constant monitoring by the teacher can prevent this waste of computer and class time.

COMPUTER USAGE WHEN NOT COMMITTED TO KEYBOARDING

In many schools, the keyboarding room will not be used for keyboarding only. There are other uses the computer can be put to and these can enrich the curriculum.

COMPUTER LITERACY AND PROGRAMMING

An introduction to computers and how they work can be offered. This course covers the history of the computer, a layperson's idea of how it works and how to

do a simple program in BASIC so that students can have an understanding and appreciation of software. Vocabulary, innovations and current applications in the computer field can be covered.

TEXT EDITING A TERM PAPER

Keyboarding is a seventh grade requirement in this district. An eighth grade elective in text editing a term paper is offered. In this course, students will review the keyboard to increase their proficiency, learn to format a research paper on a computer in a word processing mode, and be exposed to basic word processing concepts that can be applied to several word processing programs. Exposure to Scripsit, Bank Street Writer, Applewriter and ACT III, a software authoring program, are included in the course.

WORD PROCESSING FOR FACULTY AND STUDENTS

Students may sign out of study hall or the library to come to the keyboarding room to practice keyboarding skills, practice word processing skills, and to input research materials. If stations are available during a keyboarding class, they may work as the rest of the room is devoted to a keyboarding class. As the keyboarding classes are self-paced with little group work, an unused station may be used for word processing. Scriptsit is built into the network disk so that any student station can access word processing without the teacher changing the disk. If they wish to work on a document that is partially finished, a disk will have to be changed, so they may have to wait a few minutes until the keyboarding class is settled on the proper lesson.

Some faculty members may be using software for recording grades or are using authoring programs to write their own software. These faculty members can come in and use an empty computer. Faculty members with keyboarding skills can use the word processing capabilities without disturbing the rest of the class.

LAB RESOURCE FOR SUBJECT TEACHERS

The keyboarding room can be used by subject teachers as a teaching tool. The educational software market is exploding with new materials. Many programs are becoming available for the network system. Teachers can bring their class to the keyboarding room for enrichment, review, or instructional purposes. Some software is suitable for two students to work at a station as a team. The keyboarding teacher can be available to assist with any hardware or software problems and assist the regular subject teachers in selection and ordering of software.

CONCLUSIONS

Keyboarding is a required course in grade 7. It can be assumed that all students from grade 7 and up know the basic keyboard.

Keyboarding can no longer be considered a course for business students but a core course for all students. Higher levels of word processing should be business courses, but all students should have basic keyboarding skills and basic word processing skills without being a "Business" major.

In the keyboarding course, the teacher is a manager of learning—not the source of instruction. Methods of teaching and evaluating will have to be adjusted. The teacher becomes a coach—guiding and directing.

A course should be offered to remediate students who had difficulty or did not reach minimum proficiency levels. Some students may need further practice and learning to attain minimum standards.

Keyboarding skills should be reviewed and built upon every year to attain higher levels of proficiency. Students can not take one course and "know" the keyboard well enough to avoid further skill building. Yearly review of the

keyboard and further applications of keyboarding on a microcomputer should be added to the student's knowledge.

RECOMMENDATIONS

1. A course should be offered to remediate students who had difficulty or did not reach minimum proficiency levels. Some students may need further practice and learning to attain minimum standards for proper fingering and speed.

2. The business curriculum should be restructured to include grades seven through twelve with more courses such as keyboarding and word processing offered to the general student body.

3. Exposure to word processing on different software should be included in the curriculum to allow students to transfer their keyboarding skills.

4. Word processing should be offered to all students--not high level business students. Computers should be available for student use during the school day.

5. All subject area teachers in the school should cooperate and require students to use correct keyboarding techniques once they have learned proper keyboarding. Teachers should give extra credit for papers completed on a microcomputer or typewriter.

LESSON PLANS
EIGHT WEEK COURSE

WEEK	LESSON COMPLETED	TOPIC
1	1-5	Homerow, h, e, o, t, left shift
2	6-10	r, w, n, g, u, c, p, y, x right shift, comma
3	11-15	m, z, b, ?, q, v
4	16-20	Improve control and speed
5	21-25	Improve control and speed
6	26-30	4, 8, 3, 7, 5, 9, 2, 0, 6, 1
7	Skill Builder 1-5	Improve speed and accuracy
8	Scripsit	Practice materials from typing book Editing Proofreading

This plan serves as a guide. Students should be permitted to proceed at their own rate. The additional practice in Week Eight can be taken from the text that accompanies the software. Students may also practice using homework assignments from other classes as practice material. One copy must be printed for the keyboarding teacher, one for the subject teacher. All warm-up materials should be from the software or the text.

RESULTS

Most students exhibited good ability to keyboard without constantly looking at their fingers. Proper fingering technique was used for all class work.

The pretest and posttest speed scores were compared for each reading level using the pretest and the line posttest scores. All levels showed improvement.

FIRST SEMESTER

LEVEL	PRETEST MEAN	POSTTEST SPEED/ERROR MEAN
Honors*	10.53	35.05/2.63
Advanced	7.67	29.04/2.4
General College	7.45	24.54/1.73
Low General	8.41	22.67/1.6
Remedial	9.0	22.20/1.0
Special Education	5.5	14.00/1.0

SECOND SEMESTER

Second semester scores are reported separately. Teacher use of the software was more proficient, classes met more sessions due to lack of snow days and flu epidemics, and the software was available for the first class period.

LEVEL	PRETEST MEAN	POSTTEST SPEED/ERROR MEAN
Honors	10.88	40.25/2.18
Advanced	10.18	34.12/2.05
General College	8.56	30.61/1.73
Low General	7.31	22.62/2.07
Remedial	6.86	26.29/1.60

Observations have been made by math teachers who teach Introduction to Computers and Programming. Students who had taken keyboarding had no apprehension about using a computer, had good posture and position at the computer, and could input programs faster with good accuracy.

*English grouping assignments are made based partly on the California Achievement Test norms. Honor students' reading ability is equivalent to grade

twelve, Advanced are grade eleven and twelve, General College Preparatory tenth grade level, Low General read on grade level and Remedial read below grade level.

APPENDIX B

MEASURING INSTRUMENTS

The enclosed material is reproduced from
BASIC KEYBOARDING AND TYPEWRITING APPLICATIONS
(Teacher's Manual/Key) by Jerry Robinson and
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of Cincinatti, Ohio.

TECHNIQUE CHECK SHEET

RATINGS
Excellent . . . 4 points
Good . . . . . 3 points
Average . . . . 2 points
Acceptable . . 1 point

	Rating periods											
	1	2	3	4	5	6	7	8	9	10	11	12
Position at typewriter . . . . . Rating												
1. Sits in a comfortable, relaxed position directly in front of typewriter.	—	—	—	—	—	—	—	—	—	—	—	—
2. Keeps feet on floor for proper body balance.	—	—	—	—	—	—	—	—	—	—	—	—
3. Keeps elbows in relaxed, natural position at sides of body to provide correct hand position.	—	—	—	—	—	—	—	—	—	—	—	—
4. Keeps wrists low and relaxed, but off frame of typewriter. . .	—	—	—	—	—	—	—	—	—	—	—	—
5. Keeps fingers well curved, upright, and in typing position. . .	—	—	—	—	—	—	—	—	—	—	—	—
Keystroking . . . . . Rating												
1. Keeps fingers curved and upright over home keys.	—	—	—	—	—	—	—	—	—	—	—	—
2. Makes quick, snappy keystrokes with immediate key release. .	—	—	—	—	—	—	—	—	—	—	—	—
3. Maintains uniform keystroking action (force).	—	—	—	—	—	—	—	—	—	—	—	—
4. Keeps hands and arms quiet, wrists low.	—	—	—	—	—	—	—	—	—	—	—	—
5. Strikes each key with proper finger.	—	—	—	—	—	—	—	—	—	—	—	—
Space bar . . . . . Rating												
1. Keeps right thumb curved—on or close to space bar. . . .	—	—	—	—	—	—	—	—	—	—	—	—
2. Strikes space bar with a quick, down-and-in (toward palm) motion of right thumb.	—	—	—	—	—	—	—	—	—	—	—	—
3 Releases space bar instantly.	—	—	—	—	—	—	—	—	—	—	—	—
4. Does not pause before or after spacing stroke.	—	—	—	—	—	—	—	—	—	—	—	—
Carriage (element) return . . . . . Rating												
1. Returns carriage (element) quickly at ends of lines. Manual: Quick, flick-of-hand motion. Electric: Quick, little finger reach.	—	—	—	—	—	—	—	—	—	—	—	—
2. Keeps eyes on copy during and following return.	—	—	—	—	—	—	—	—	—	—	—	—
3. Starts new line without break or pause.	—	—	—	—	—	—	—	—	—	—	—	—
Shift keys . . . . . Rating												
1. Reaches quickly with little fingers; keeps other fingers in typing (home-key) position. . . .	—	—	—	—	—	—	—	—	—	—	—	—
2. Holds shift key all the way down as the letter key is struck—capitals are uniformly on the line of writing. . .	—	—	—	—	—	—	—	—	—	—	—	—
3. Releases shift key quickly after letter is struck.	—	—	—	—	—	—	—	—	—	—	—	—
4. Does not pause before or after shift-key stroke.	—	—	—	—	—	—	—	—	—	—	—	—
Tabulator key or bar . . . . . Rating												
1. Reaches quickly with controlling finger; keeps other fingers near typing (home-key) position.	—	—	—	—	—	—	—	—	—	—	—	—
2. Uses minimum hand and arm motion.	—	—	—	—	—	—	—	—	—	—	—	—
3. Continues typing immediately after tabulating—without pause or interruption.	—	—	—	—	—	—	—	—	—	—	—	—

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TECHNIQUE CHECK SHEET, continued

RATINGS
Excellent . . . 4 points
Good . . . . . 3 points
Average . . . . 2 points
Acceptable . . 1 point

	Rating periods											
	1	2	3	4	5	6	7	8	9	10	11	12
Reading/typing response patterns . . . . . Rating												
1. Keeps eyes on copy—concentrates on copy to be typed. . . .	—	—	—	—	—	—	—	—	—	—	—	—
2. Keeps carriage (element) moving without jerks and pauses—maintains continuous keystroking by reading slightly ahead in the copy.	—	—	—	—	—	—	—	—	—	—	—	—
3. Types one-hand letter combinations and words quickly and with keystroking action in fingers.	—	—	—	—	—	—	—	—	—	—	—	—
4. Types balanced-hand words by *word* response.	—	—	—	—	—	—	—	—	—	—	—	—
5. Uses a smooth, fluent rhythm pattern which varies according to difficulty of copy being typed.	—	—	—	—	—	—	—	—	—	—	—	—
Mind-set . . . . . Rating												
1. Follows directions carefully.	—	—	—	—	—	—	—	—	—	—	—	—
2. Gives attention to technique cues and goals.	—	—	—	—	—	—	—	—	—	—	—	—
3. Makes effort to reach suggested goals.	—	—	—	—	—	—	—	—	—	—	—	—
4. Practices with a purpose at assigned practice level.	—	—	—	—	—	—	—	—	—	—	—	—
5. Shows alert attention, but shows no evidence of tenseness in shoulders, arms, and hands.	—	—	—	—	—	—	—	—	—	—	—	—

SUGGESTED EVALUATION/GRADING PLAN

1. Observe and rate the student on each major technique listed on this Check Sheet (or those that are currently appropriate), using point scores of 4 = A; 3 = B; 2 = C; 1 = D. Enter the appropriate point score opposite the word *Rating* for each technique being rated.
2. When observing and rating the student, place a check mark opposite each numbered item that needs immediate improvement.
3. After all currently appropriate techniques have been evaluated and rated, enter the *Rating* scores in a table such as the one illustrated below.

Grade range
A = 3.6–4.0
B = 2.6–3.5
C = 1.6–2.5
D = 0.6–1.5
F = 0–0.5

4. Add (across) the *Rating* scores awarded the student for each technique and enter the total in the *Total* column opposite the student's name.
5. Divide the total by the number of techniques rated (8 in the illustrative examples) and enter the average in the *Average* column opposite the student's name.
6. Award A-B-C-D-F grades on the basis of the *Grading range* scale given in the block above.

Name of student	Position	Essential Motions					Response patterns	Mind-set	Total	Average
		Key-stroking	Space bar	Carriage return	Shift keys	Tabulator				
Anglin, Sue	4	4	2	3	4	4	3	4	28	3.5
Bucerias, Juan	3	3	3	4	3	3	2	3	24	3.0
Cantrell, Tina	2	2	1	1	2	1	1	2	12	1.5
Donetti, Mike	2	3	2	2	3	3	3	3	21	2.6

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Name _____ Grade _____

PROGRESS SHEET

LESSON	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Skill Builders 1	2	3	4	5
DATE																																			
POSITION																																			
FINGERS																																			
EYES																																			
EFFORT																																			
L SPEED																																			
P SPEED																																			
LEFT OFF																																			

ABSENT:

COMMENTS:

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5101 Madison Road, Cincinnati, OH 45227
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June 20, 1984

Ms. Diane Brescia
Har-Bur Middle School
R. R. #1
Burlington, CT 06013

Dear Ms. Brescia

We have your letter of June 13 in which you indicate that you are writing a curriculum to be used with our Microcomputer Keyboarding software.

Permission is granted to use the Technique Check Sheet on pages 20 and 21 of the Teacher's Manual/Key for BASIC KEYBOARDING AND TYPEWRITING APPLICATIONS, prepared by Jerry Robinson, in the curriculum to be submitted to the state.

The reproduced material should indicate the source--the title, authors, and publisher. A statement should indicate that the material is used by permission of South-Western Publishing Co.

Sincerely yours

Janice Heashe

(Mrs.) Janice Heashe
Royalty and Permissions Coordinator

PRINCIPAL
Dr James A Schmidt

GUIDANCE
Mr Robert R. Kendrick

June 13, 1984

Ms. Janice Heashey
South-Western Publishing Company
5101 Madison Road
Cincinnati, Ohio 45227

Ms. Heashey;

Har-Bur Middle Schools is working under a state grant writing a curriculum to be used with your Microcomputer Keyboarding software.

To submit a complete curriculum to the state, I need to reproduce pages 20 and 21 of the Teacher's Manual/Key, your inventory number T37M. Please send written permission to use this material.

Thank you,

Diane Brescia

APPENDIX C

TIME SEQUENCE GRAPHIC

DEVELOPING A
TIME SEQUENCE GRAPHIC FOR MICROCOMPUTER KEYBOARDING CURRICULUM

(Time Schedule: July 1, 1983-June 30, 1984)

Objective	Person(s) Responsible	Task to be Completed by 7/30 8/30 11/30 1/30 4/30 5/30 6/30	Project Manager Verification
1. Review, evaluate and select print materials and software	Business Dept. Head Business Teacher Computer Teacher	→	
2. Write pilot curriculum and prepare evaluation instrument	Business Dept. Head Business Teacher Computer Teacher	→	
3. Prepare interim report on pilot	Business Teacher	→	
4. Modify curriculum Submit mid-year progress report on pilot	Business Dept. Head Business Teacher Computer Teacher	→	
5. Prepare interim report on pilot	Business Teacher	→	
6. Make final modification to pilot based on evaluation	Business Teacher	→	
7. Prepare final curriculum	Business Dept. Head Business Teacher Computer Teacher St. Consultants	→	
8. Disseminate results and submit final report	Project Director	→	

APPENDIX C